Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Synthesis of calixresorcarenes using magnetic poly triazine-benzene sulfonamide-SO_3H

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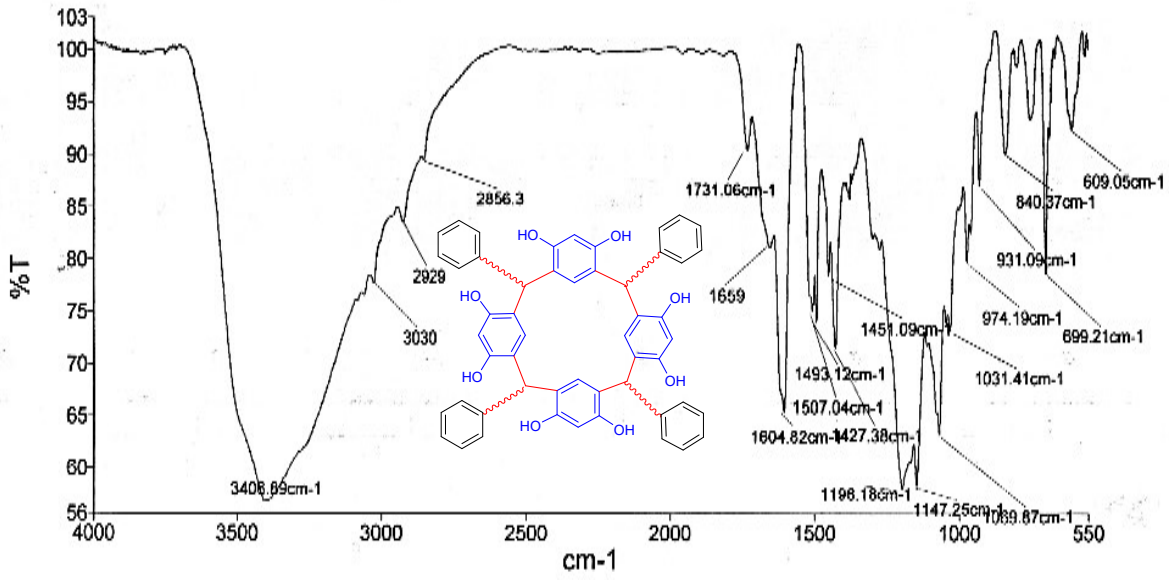
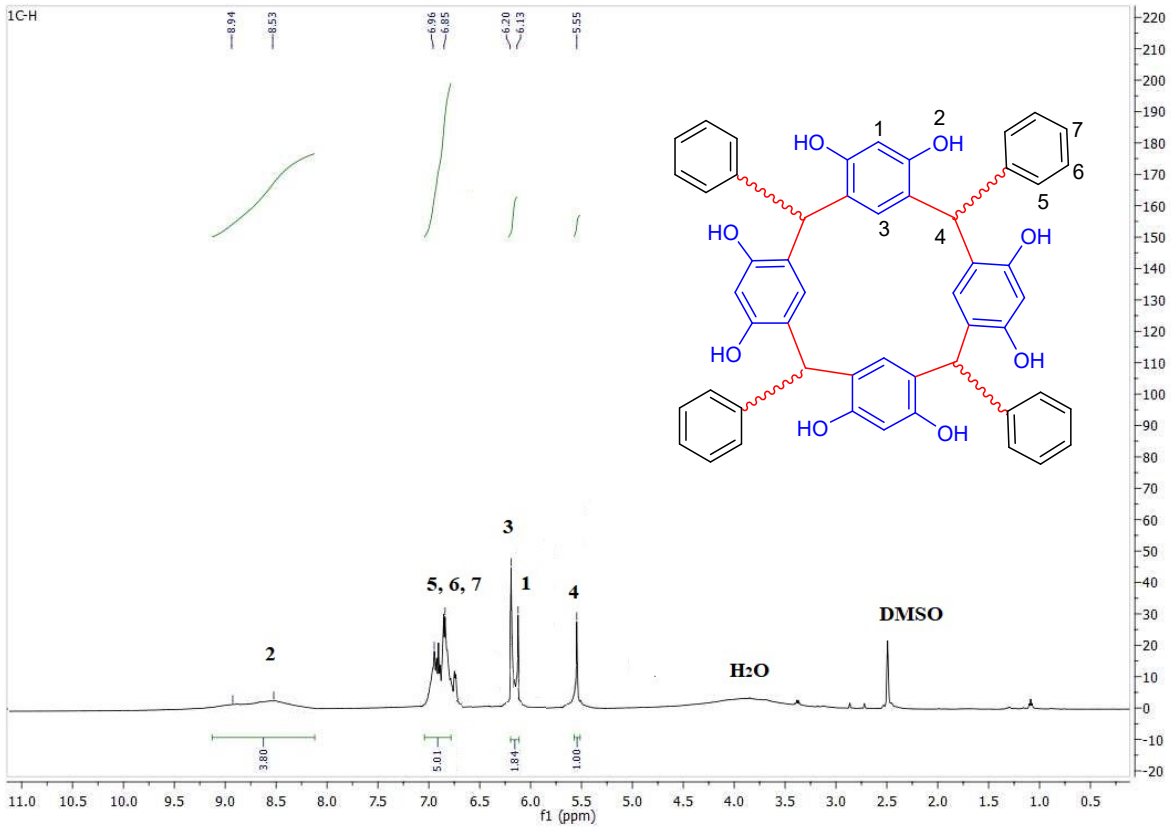
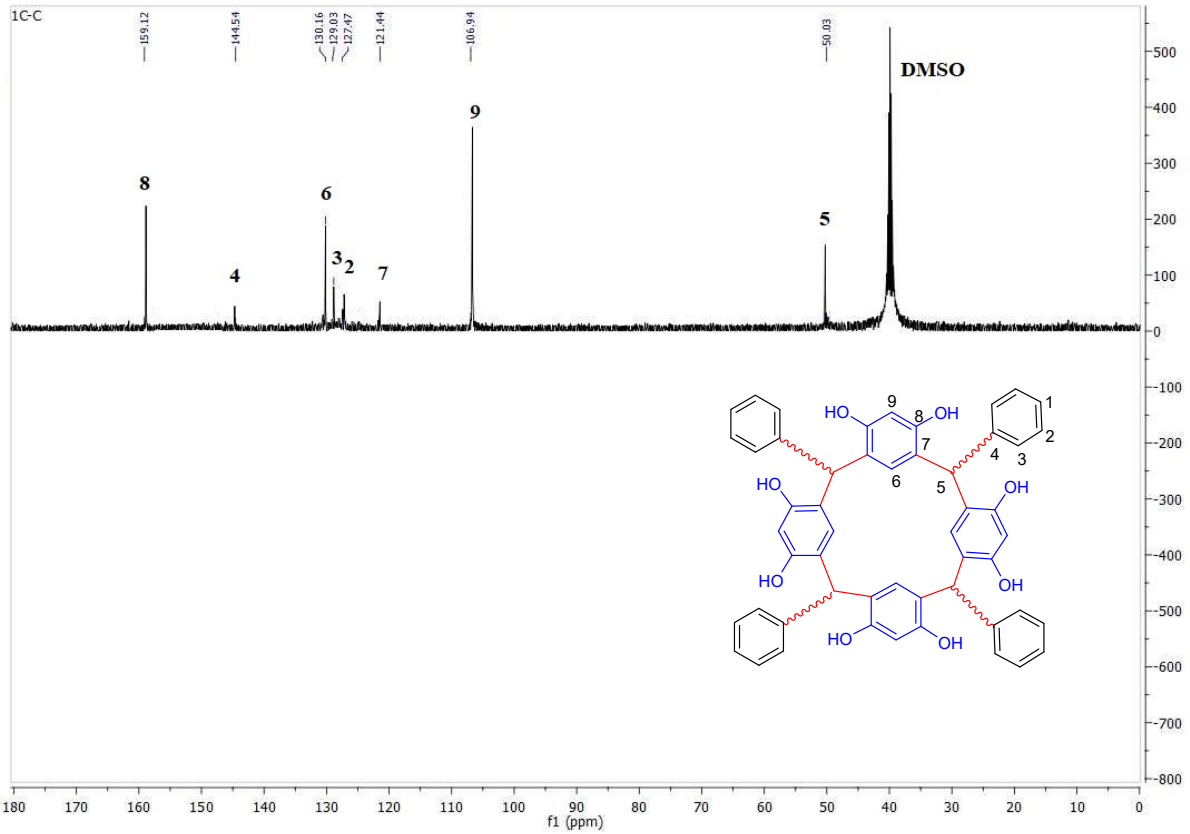
2,8,14,20-Tetraphenyl-4,6,10,12,16,18,22,24-octahydroxycalix[4]-resorcarene (3a)

Colorless solid, mp > 300 °C (dec); FT-IR (KBr) *v*: 3406, 3030, 2929 cm^{-1}; ^{1}H NMR (500 MHz, DMSO-d_6) δ ppm: 5.55 (s, 1H, CH, H_4), 6.13 (s, 1H, Ar-H, H_1), 6.20 (s, 1H, Ar-H, H_3), 6.75-6.96 (m, 5H, Ar-H, H_5, H_6, H_7), 8.53-8.94 (OH, broad peak, H_2, 3H), ppm. ^{13}C NMR (125 MHz, DMSO-d_6) δ ppm: 50.03, 106.94, 121.44, 127.44, 127.47, 129.03, 130.16, 144.54, 159.12. MS: m/z = 702 [M+].



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130.16
129.03
127.47
121.44
106.94
50.03
DMSO
8
6
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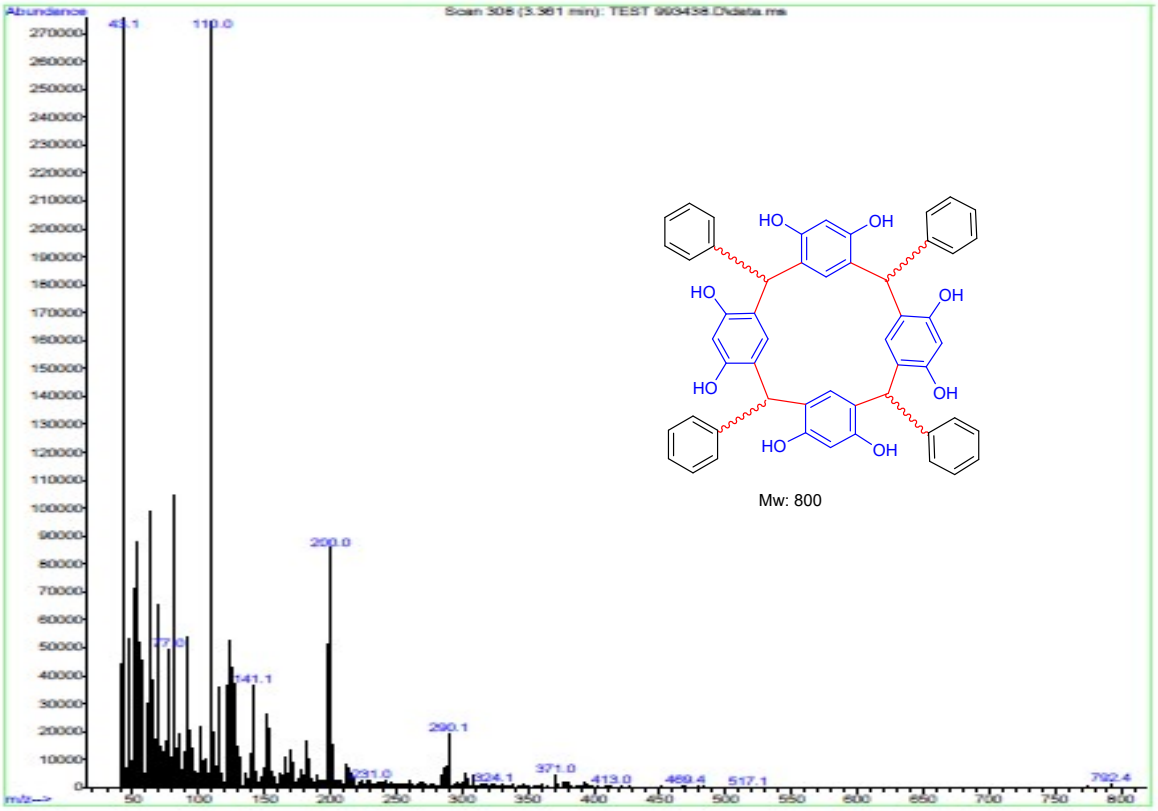
5
4
3
2
7
HO
OH
f1 (ppm)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231.0
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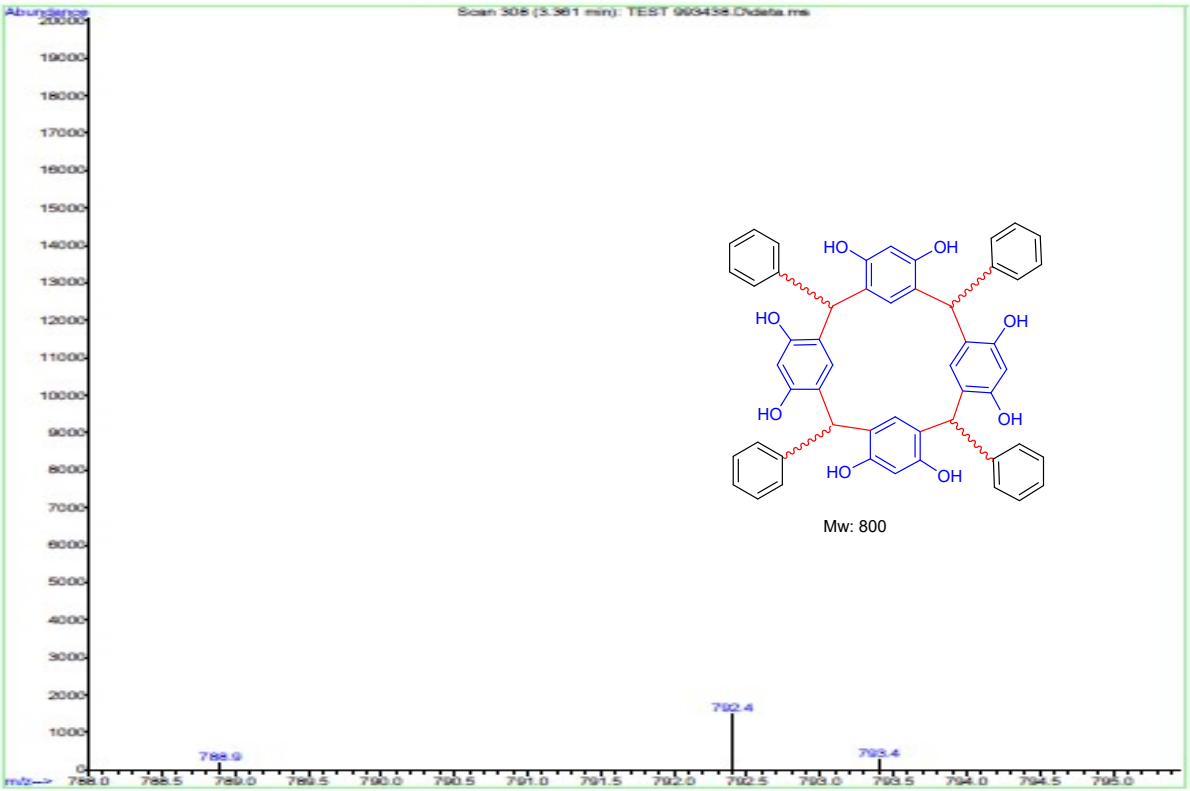
371.0
413.0
469.4
517.1
792.4
m/z-->

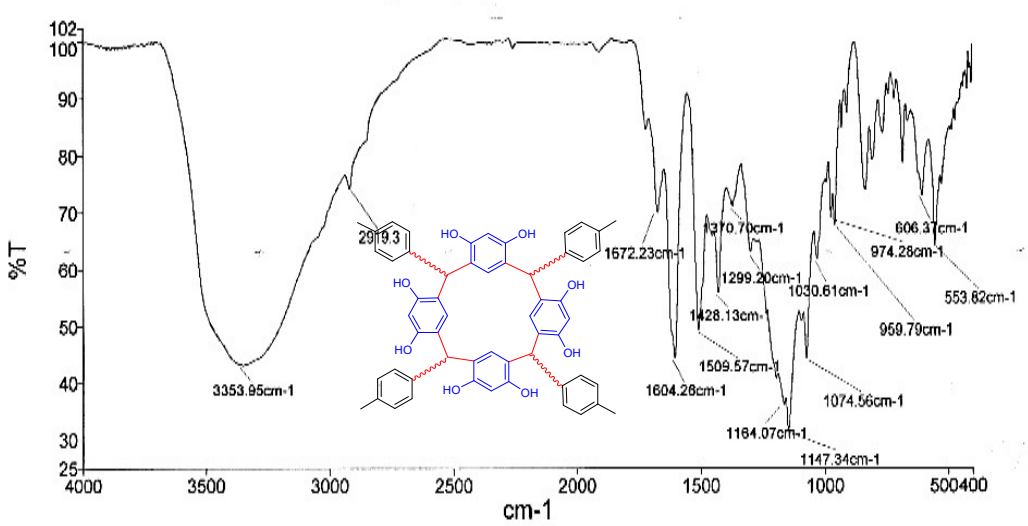
Mw: 800

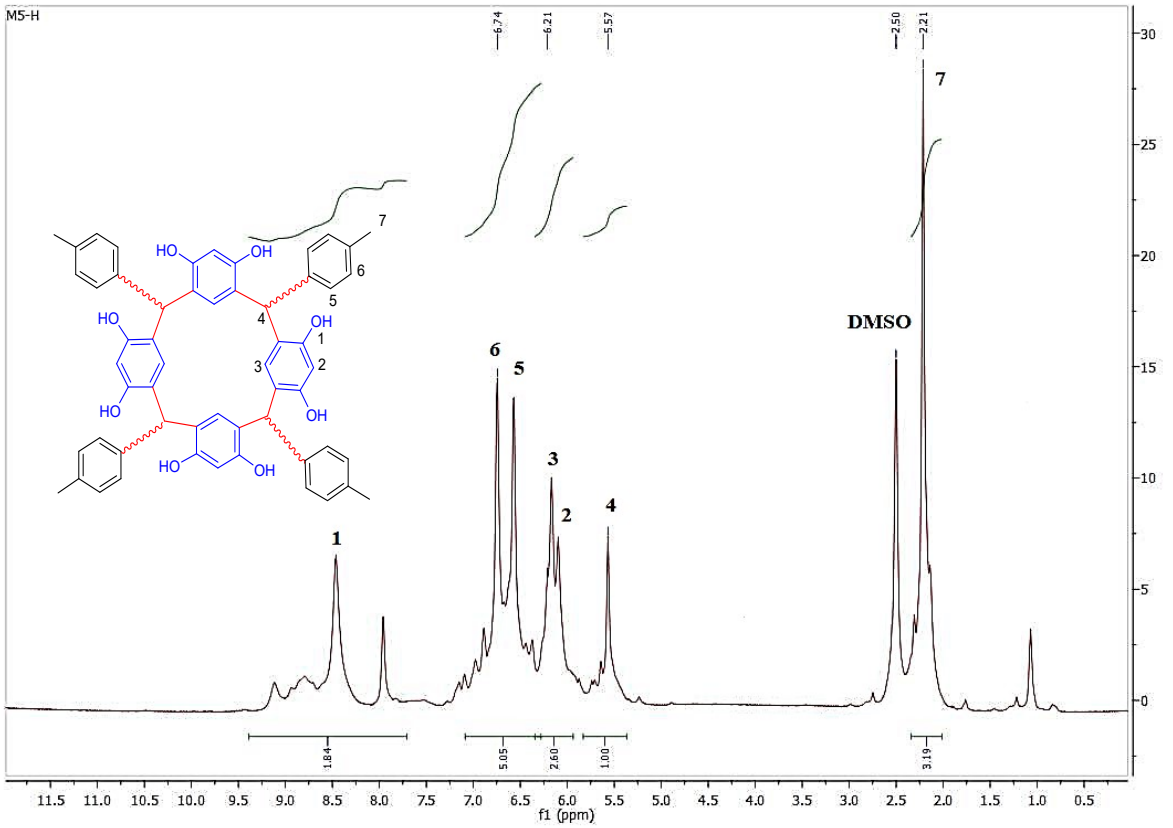


Mw: 800

2,8,14,20-Tetra-p-tolyl-4,6,10,12,16,18,22,24-octahydroxycalix[4]-resorcarene (3b)

Reddish orange solid, mp > 300 °C (dec); FT-IR (KBr) *v*: 3353, 3137, 2919 cm^{-1}; ^{1}H NMR (500 MHz, DMSO-d_6) δ ppm: 2.21 (s, 3H, H_7), 5.57 (s, 1H, CH, H_4), 6.09 (s, 1H, Ar-H, H_2), 6.16 (s, 1H, Ar-H, H_3), 6.37-6.97 (m, 4H, Ar-H, H_5, H_6, 4H), 7.96-9.12 (OH, broad peak, H_1, 2H), ppm. ^{13}C NMR (125 MHz, DMSO-d_6) δ ppm: 20.04, 55.75, 106.54, 121.05, 127.75, 128.86, 133.20, 143.91, 153.29. MS: m/z = 856 [M+].

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6.74
6.21
5.57
2.50
2.21
DMSO
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2
3
4
5
6
7
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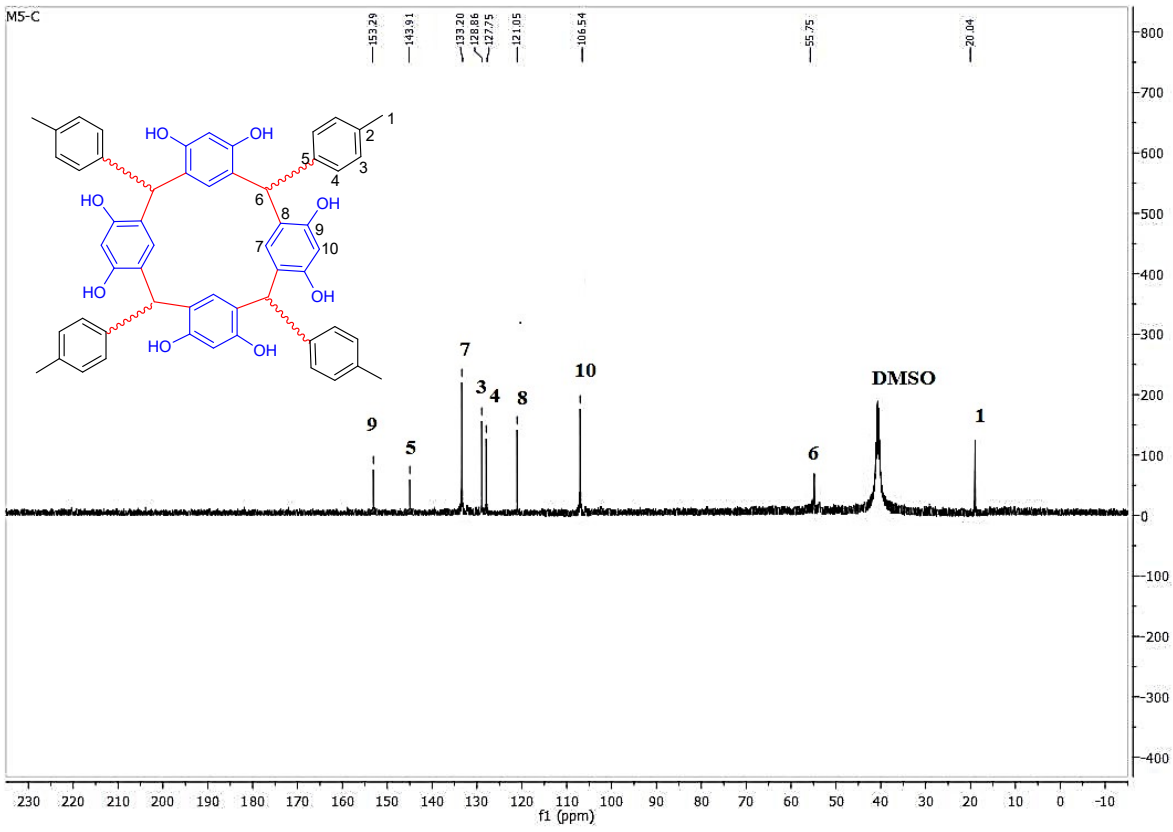
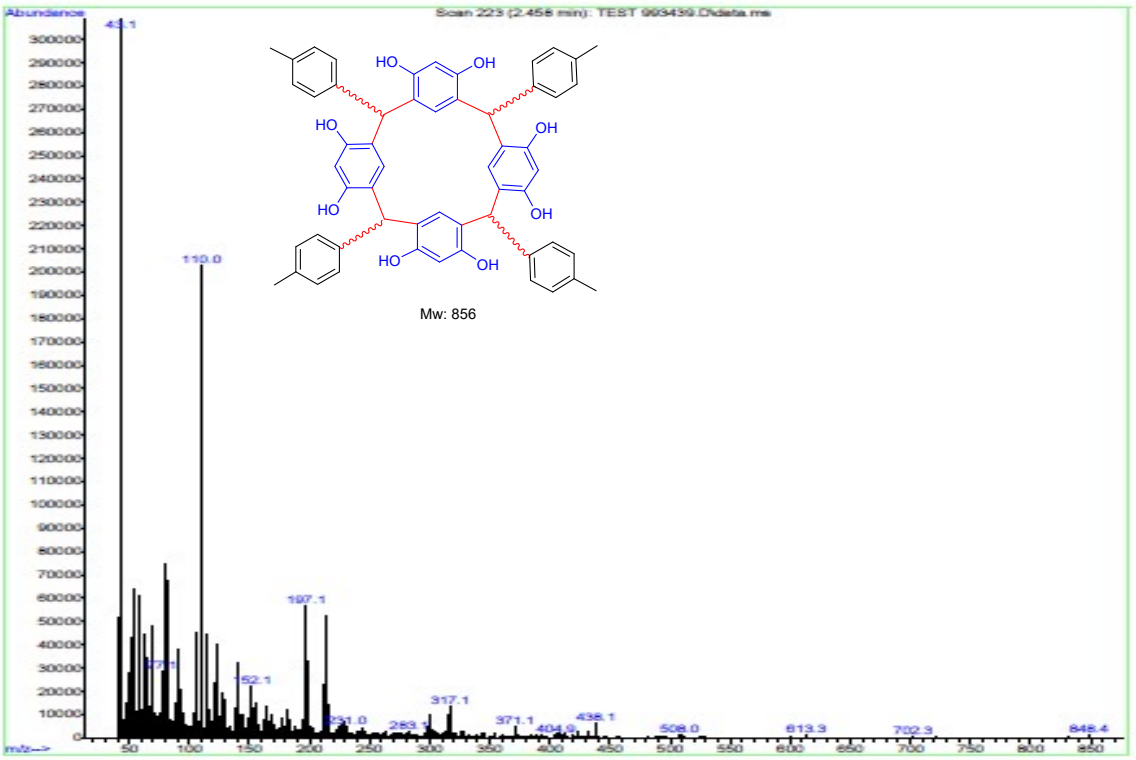
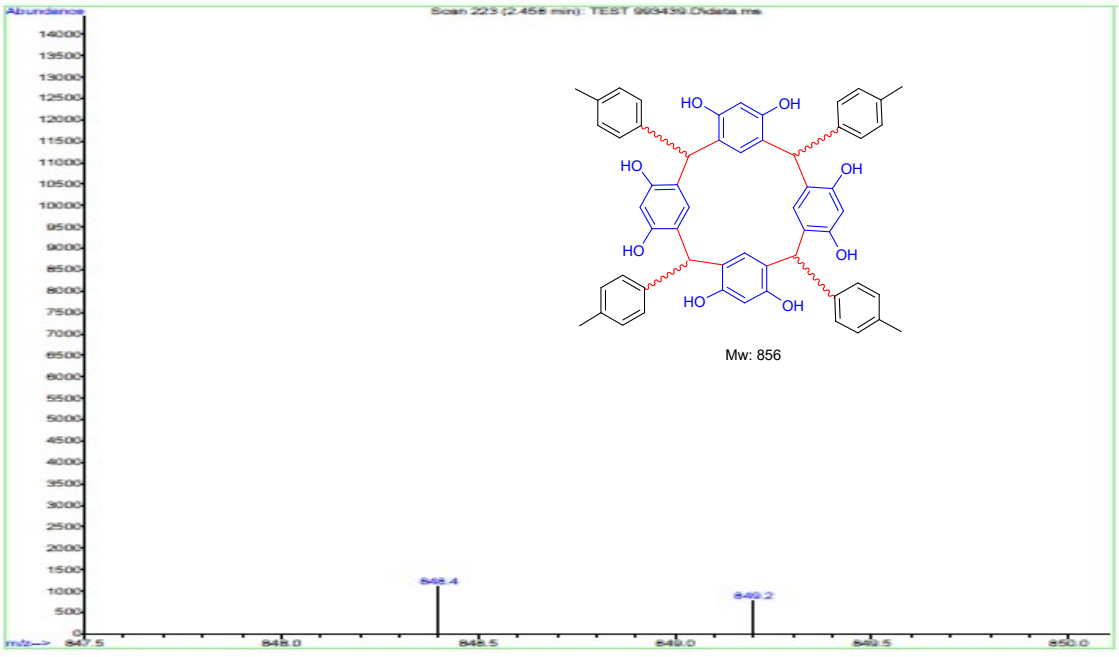
5.05
2.60
1.00
3.19
f1 (ppm)


M5-C
153.29
143.91
133.20
128.86
127.75
121.05
106.54
55.75
20.04
DMSO
f1 (ppm)

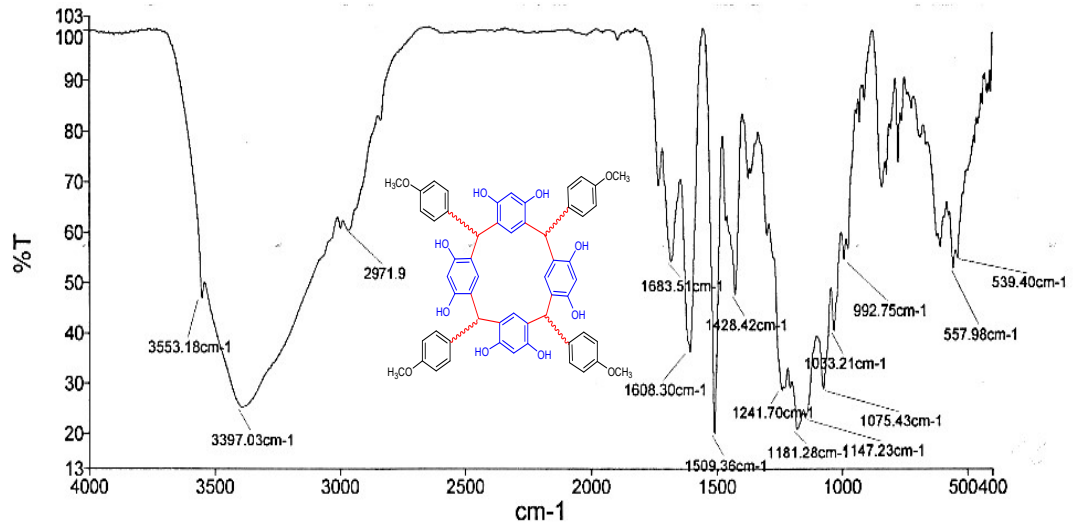


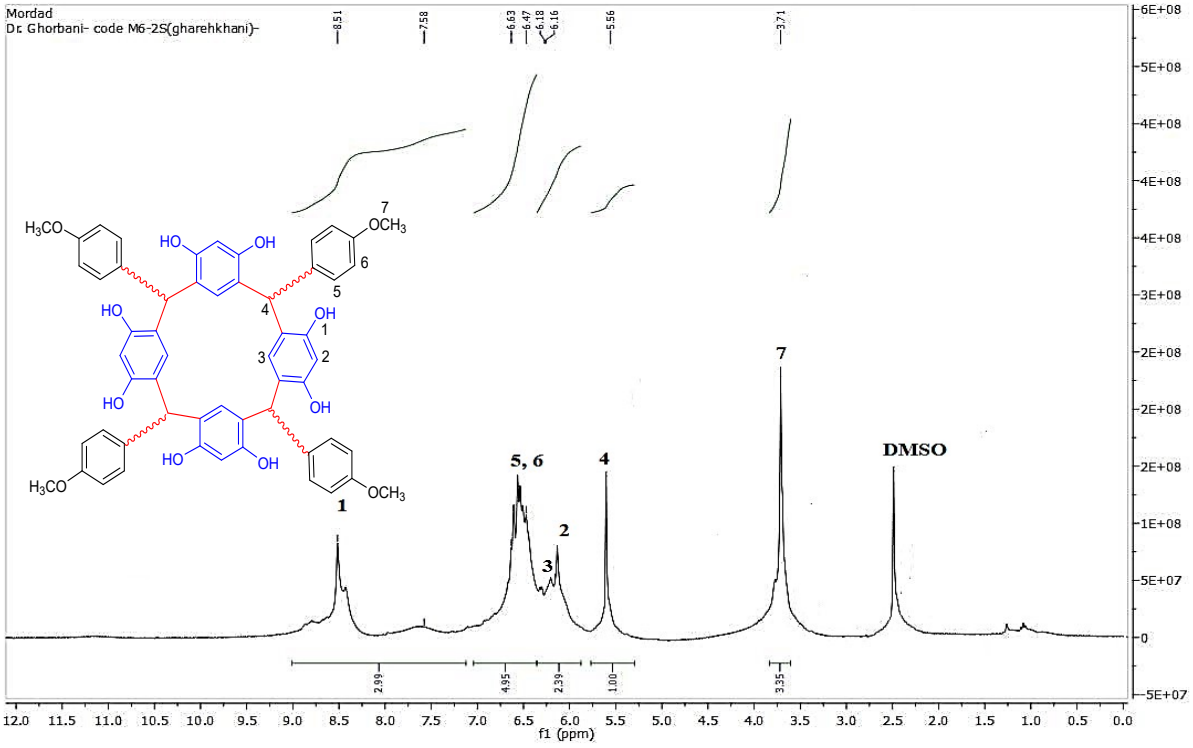


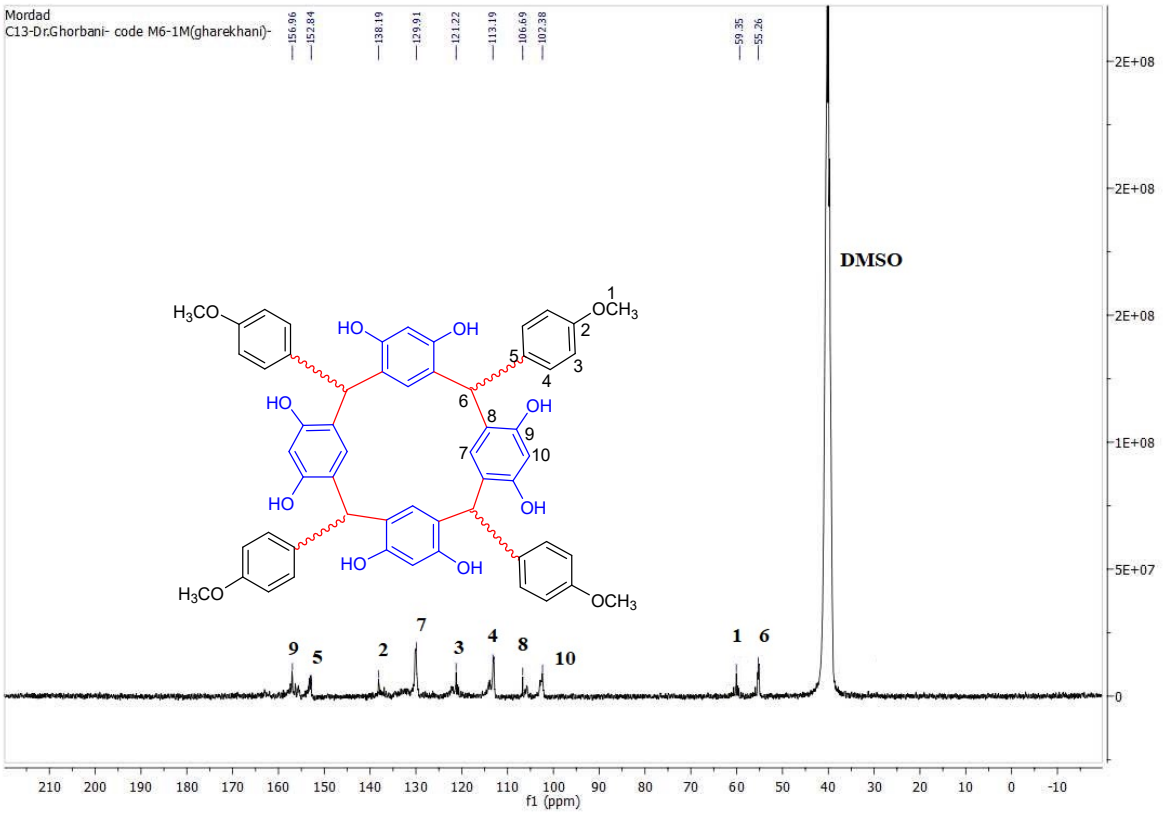
2,8,14,20-Tetra-p-methoxyphenyl-4,6,10,12,16,18,22,24-octahydroxycalix[4]-resorcarene (3c)

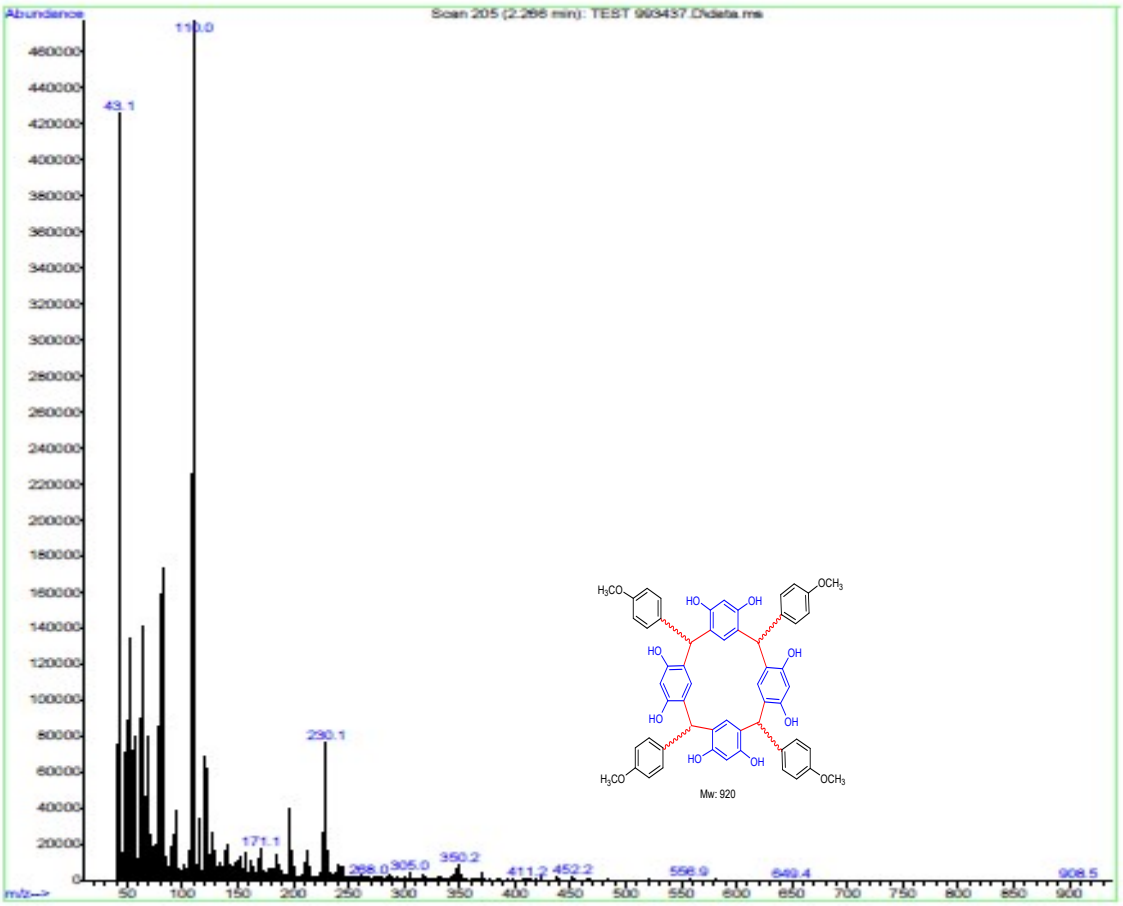
Reddish orange solid, mp > 300 °C (dec); FT-IR (KBr) *v*: 3553, 3397, 2971 cm^{-1}; ^1H NMR (300 MHz, DMSO-d_6) δ ppm: 3.71 (s, 3H, CH_3 H_7), 5.56 (s, 1H, CH, H_4), 6.16 (s, 1H, Ar-H, H_2), 6.18 (s, 1H, Ar-H, H_3), 6.47-6.63 (m, 4H, Ar-H,

H_5, H_6, 4H), 7.58-8.51 (OH, broad peak, H_1, 3H), ppm. ^{13}C NMR (75 MHz, DMSO-d_6) δ ppm: 55.26, 59.35, 102.38, 106.69, 113.19, 121.22, 129.91, 138.19, 152.84, 156.96.






Mordad
C13-Dr.Ghorbani- code M6-1M(gharekhani)-
156.96
152.84
138.19
129.91
121.22
113.19
106.69
102.38
59.35
55.26
DMSO
f1 (ppm)


Abundance
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350.2
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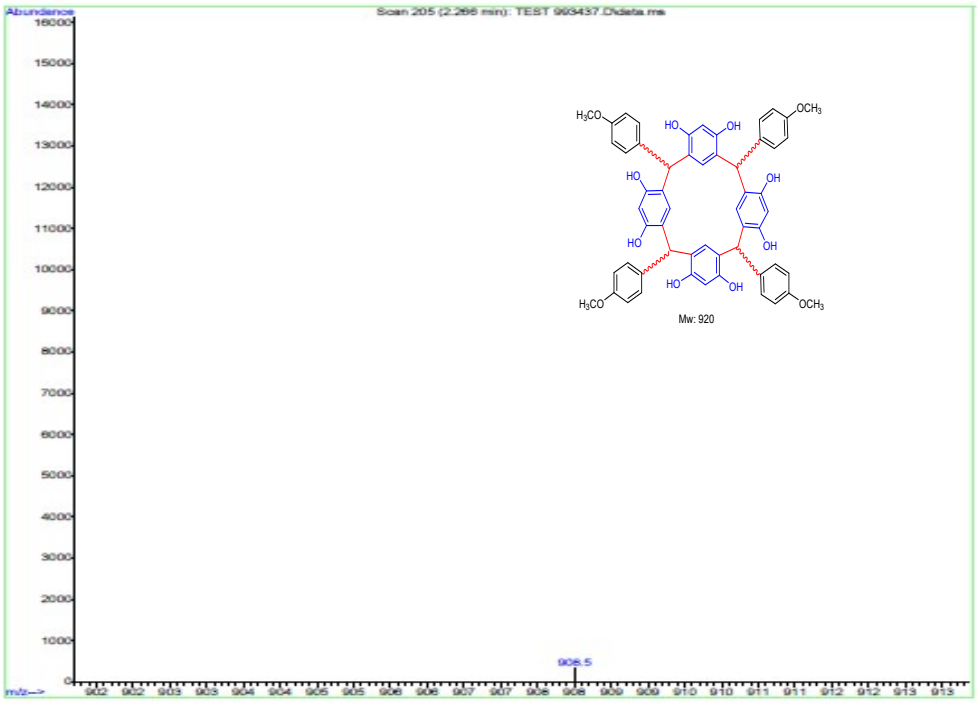
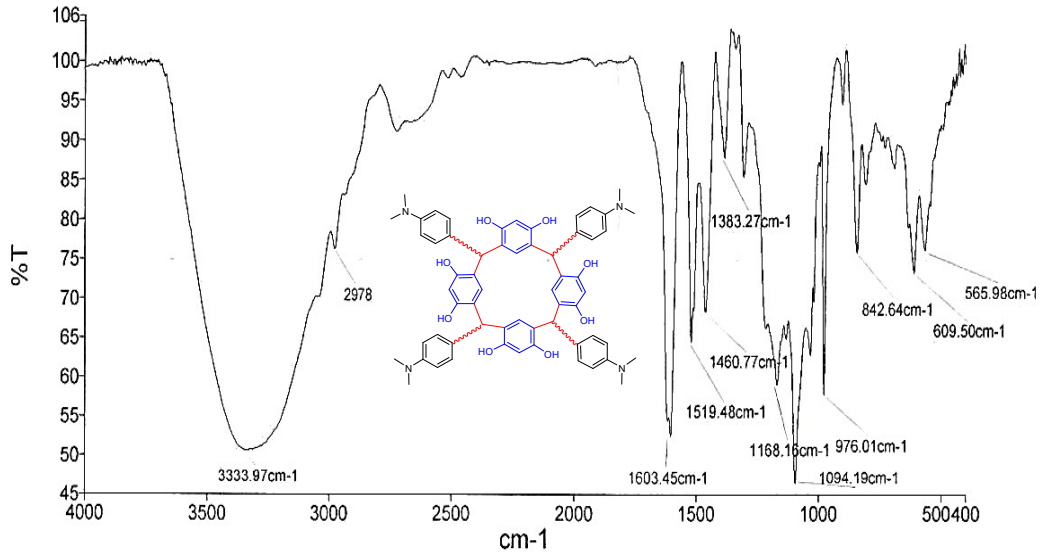
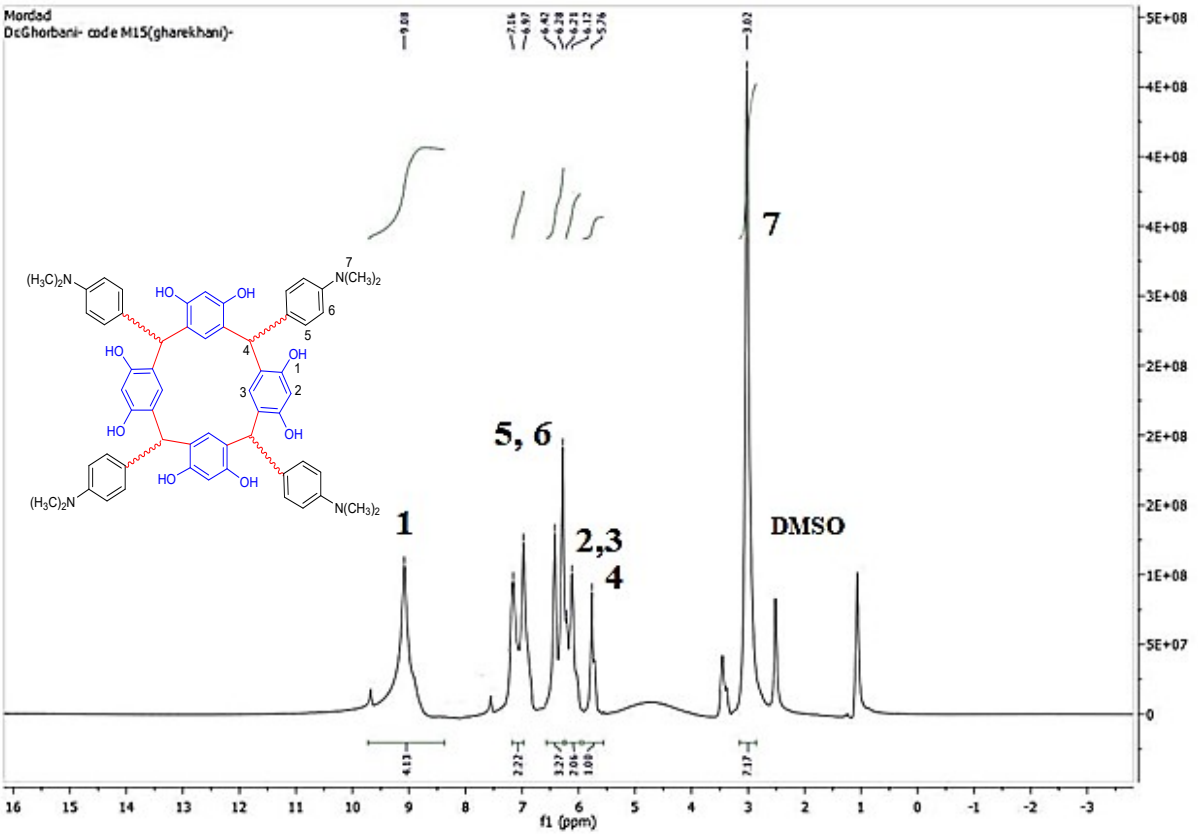
452.2
556.9
649.4
908.5
m/z-->

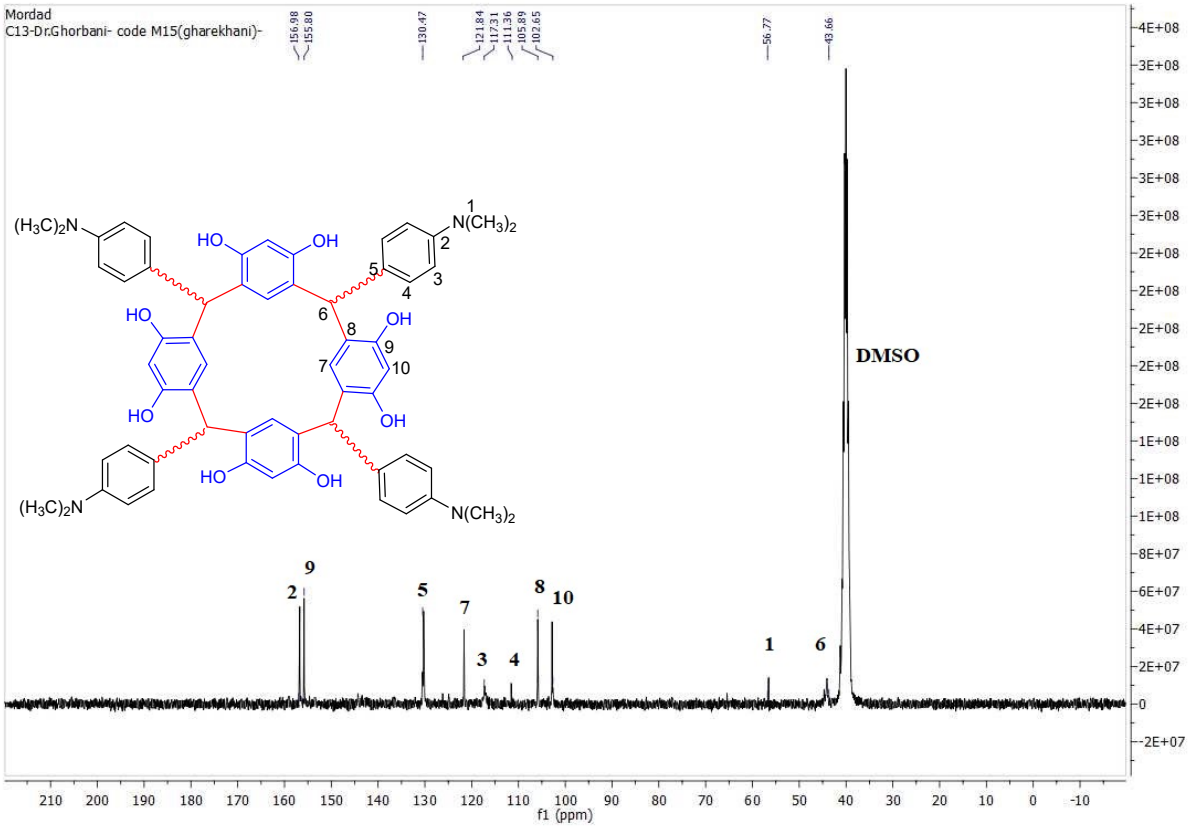


2,8,14,20-Tetra-p-N,N-dimethylphenyl-4,6,10,12,16,18,22,24-octahydroxycalix[4]-resorcarene (3d)

Yellow solid, mp: 228-230 °C; FT-IR (KBr) *v*: 3268, 3161, 3004 cm^{-1}; ^{1}H NMR (300 MHz, DMSO-d_6) δ ppm: 3.02 (s, 7H, $N(CH_3)_2$, H_7), 5.76 (s, 1H, CH, H_4), 6.12 (s, 1H, Ar-H, H_2), 6.21 (s, 1H, Ar-H, H_3), 6.28-7.16 (m, 4H, Ar-H, H_5, H_6, 4H), 9.89 (OH, broad peak, H_1, 4H), ppm. ^{13}C NMR (75 MHz, DMSO-d_6) δ ppm: 43.66, 56.77, 102.65, 105.89, 111.36, 117.31, 121.84, 130.47, 155.80, 156.98.

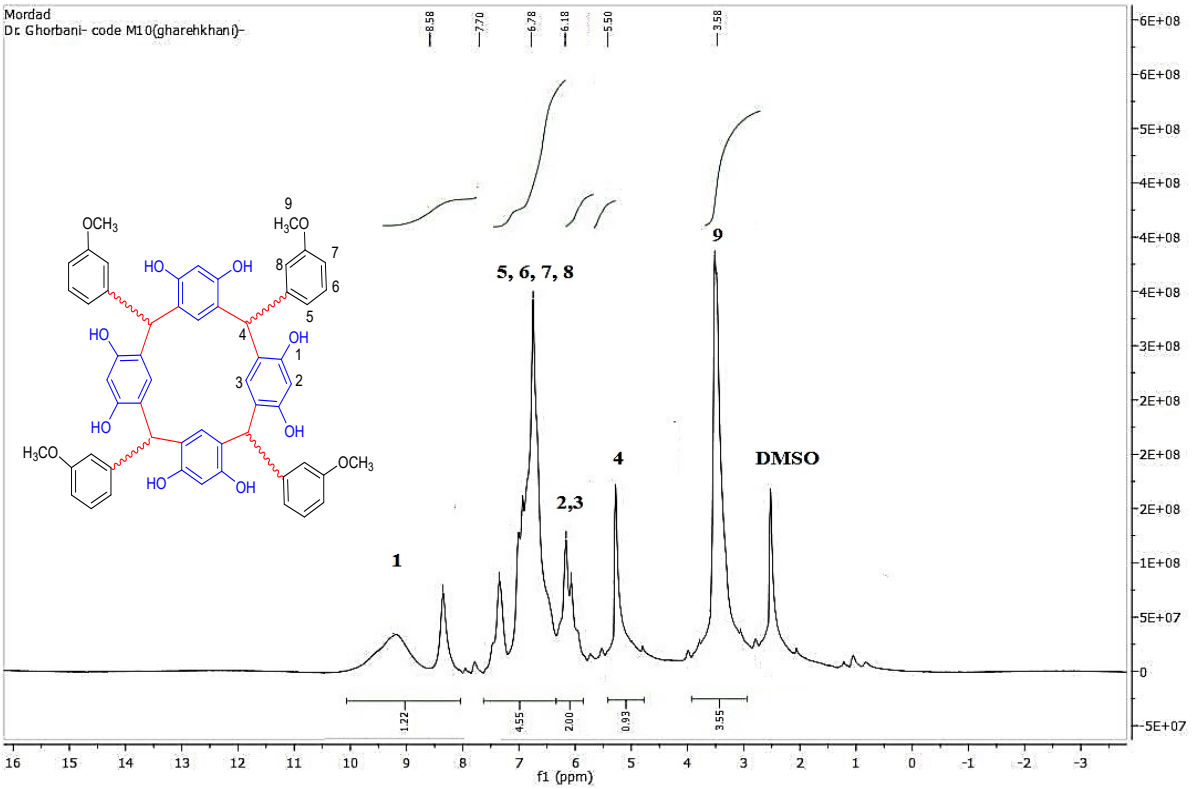


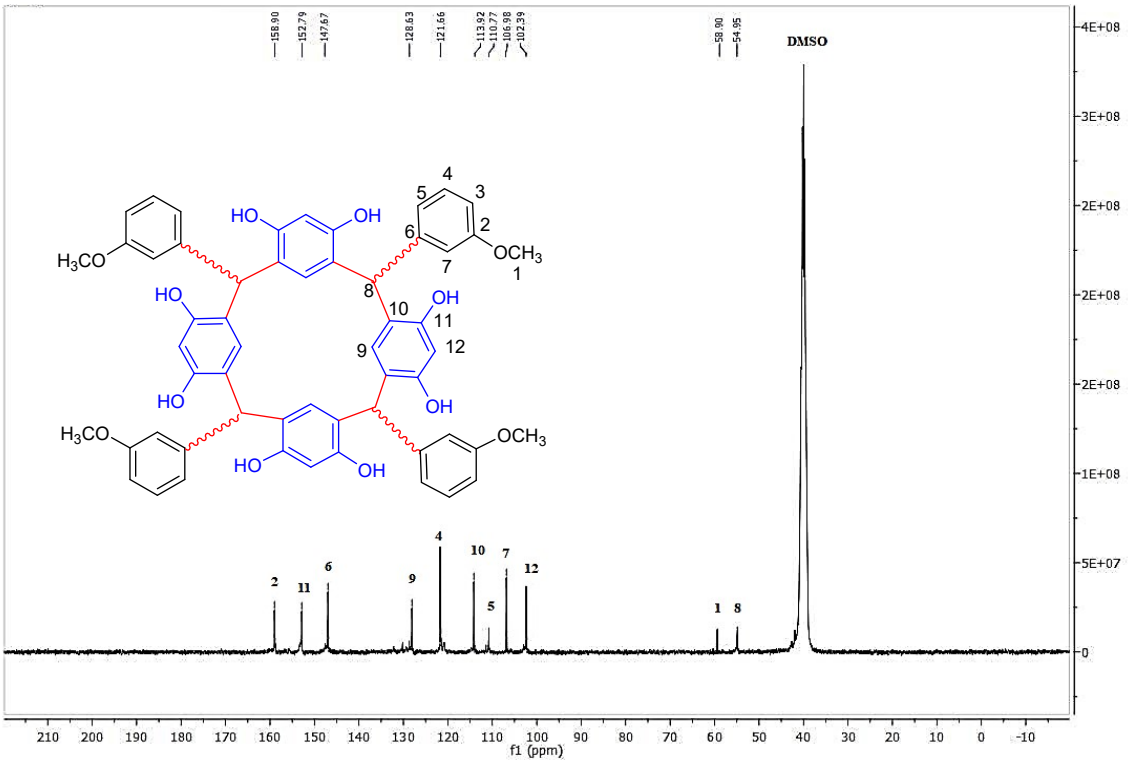




2,8,14,20-Tetra-m-methoxyphenyl-4,6,10,12,16,18,22,24-octahydroxycalix[4]-resorcarene (3e)

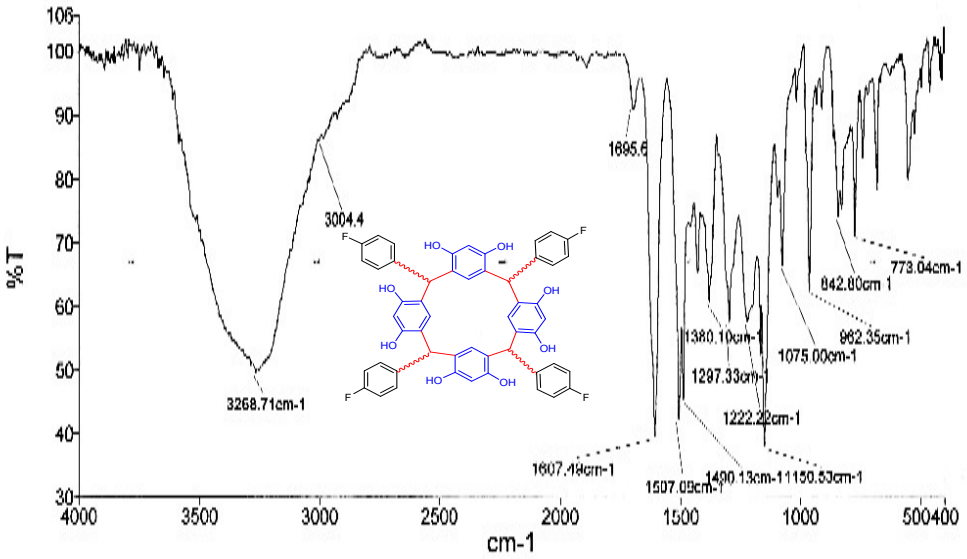
Red solid, mp: 298-300 °C; FT-IR (KBr) *v*: 3403, 3059, 2926 cm^{-1}; ^{1}H NMR (500 MHz, DMSO-d_6) δ ppm: 3.58 (s, 3H, OCH_3, H_9), 5.50 (s, 1H, CH, H_4), 6.16 (s, 1H, Ar-H, H_2), 6.18 (s, 1H, Ar-H, H_3), 6.50-7.70 (m, 3H, Ar-H, H_5, H_6, H_7, H_8, 4H), 8.58-9.5 (OH, broad peak, H_1, 3H), ppm. ^{13}C NMR (125 MHz, DMSO-d_6) δ ppm: 54.95, 58.90, 102.39, 106.98, 110.77, 113.92, 121.66, 128.63, 147.67, 152.79, 158.90.

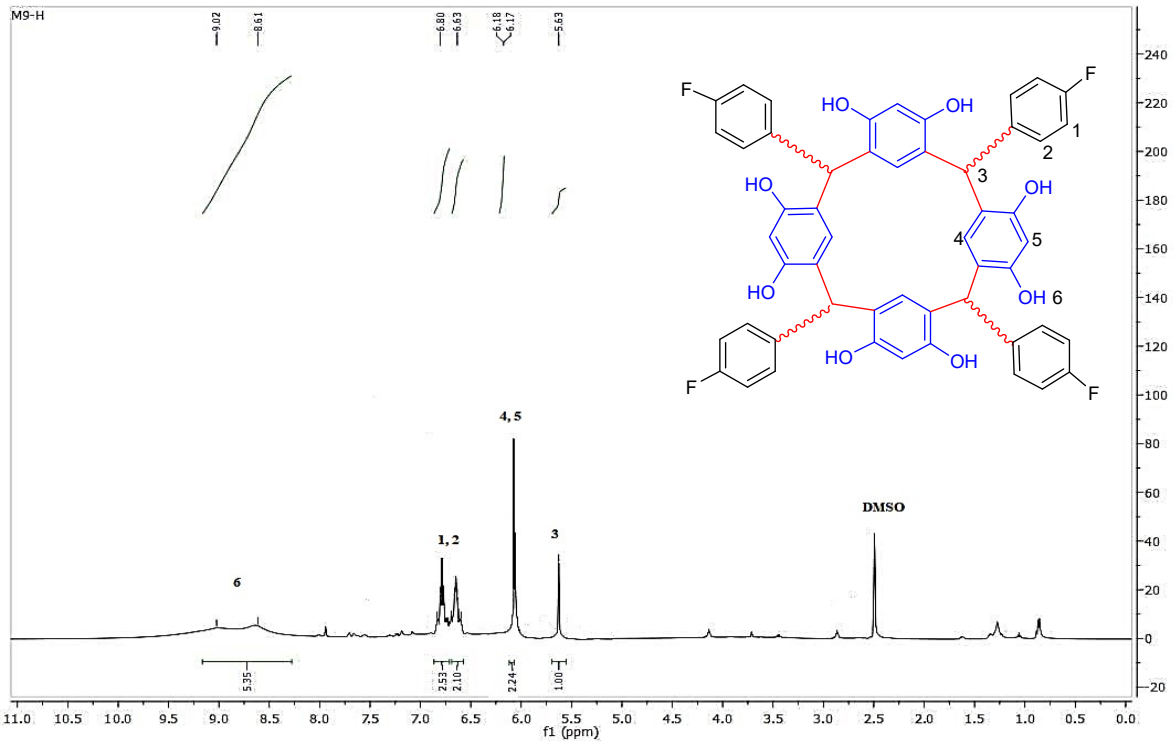


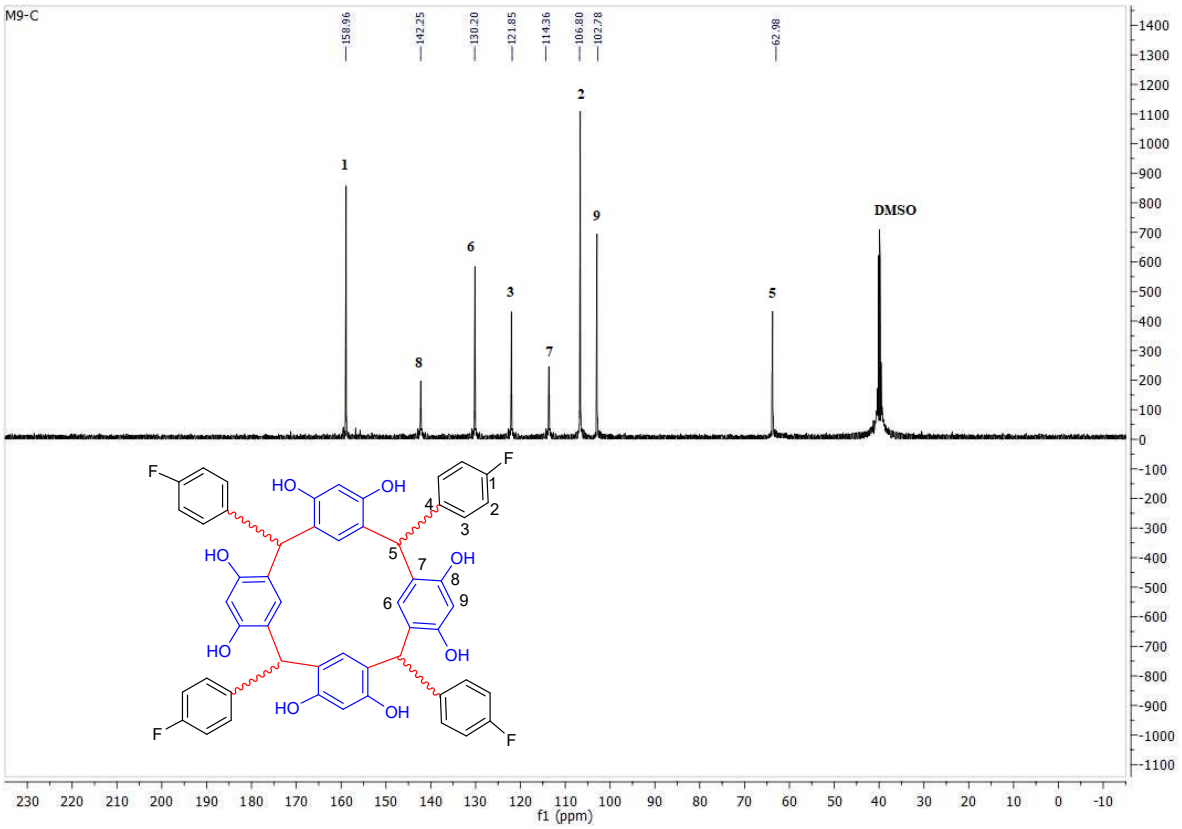


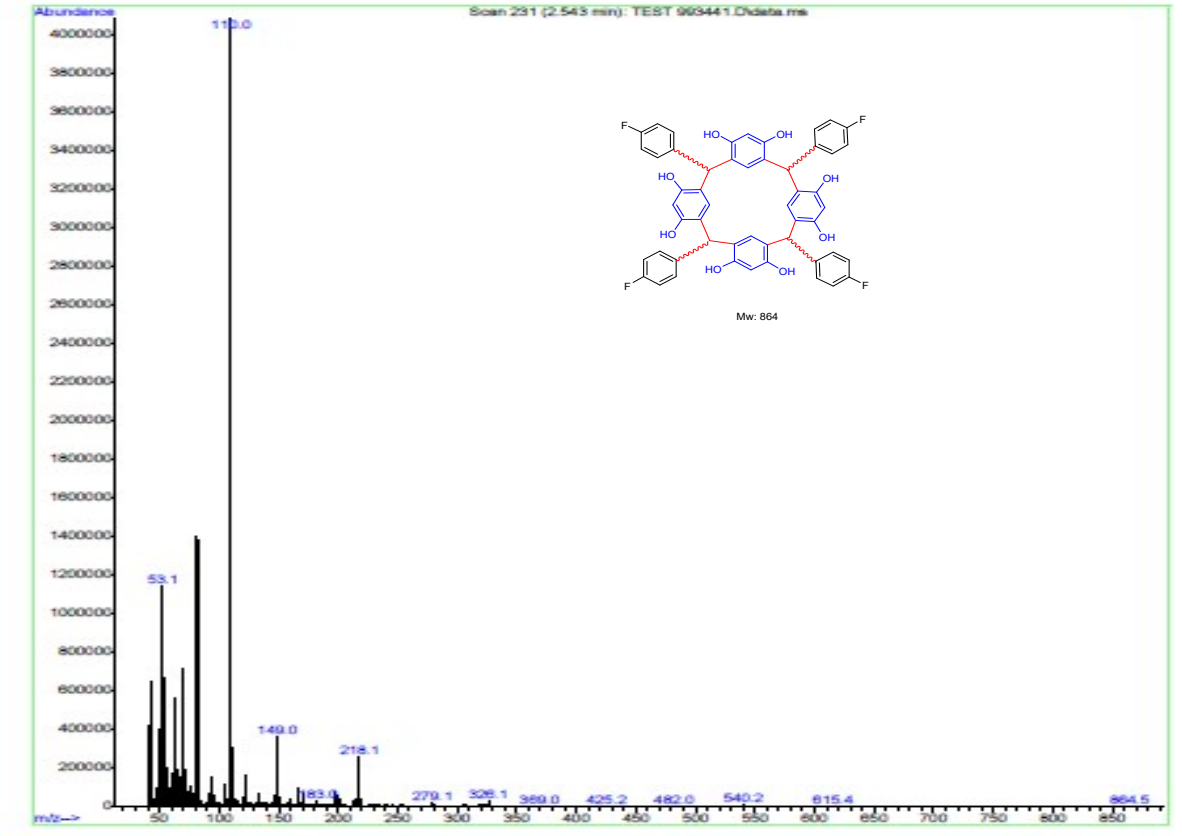
2,8,14,20-Tetra-p-flourophenyl-4,6,10,12,16,18,22,24-octahydroxycalix[4]-resorcarene (3e)

Yellow solid, mp: 223-225 °C; FT-IR (KBr) *v*: 3268, 3061, 3004 cm^{-1}; ^{1}H NMR (500 MHz, DMSO-d_6) δ ppm: 5.63 (s, 1H, CH, H_3), 6.17 (s, 1H, Ar-H, H_5), 6.18 (s, 1H, Ar-H, H_4), 6.63-6.80 (m, 4H, Ar-H, H_1, H_2, 4H), 8.65-9.05 (OH, broad peak, H_6, 4H), ppm. ^{13}C NMR (125 MHz, DMSO-d_6) δ ppm: 62.98, 102.78, 106.80, 114.36, 121.85, 130.20, 142.25, 158.96. MS: m/z = 864 [M+].






M9-C
158.96
142.25
130.20
121.85
114.36
106.80
102.78
62.98
1
2
3
4
5
6
7
8
9
DMSO
F
HO
OH
f1 (ppm)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218.1
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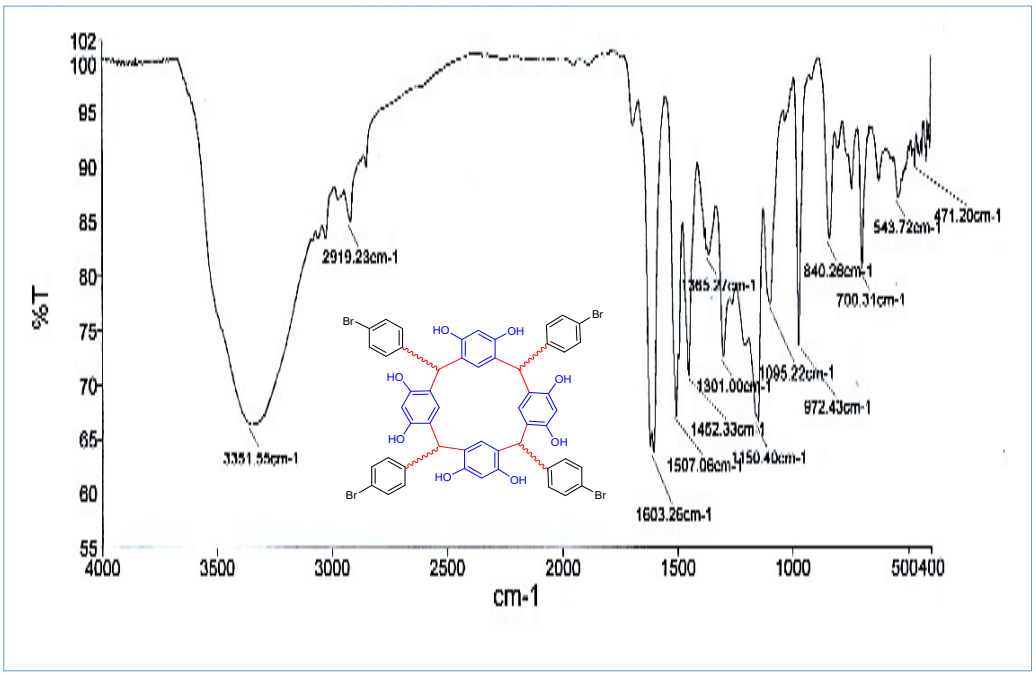
Mw: 864

2,8,14,20-Tetra-p-bromophenyl-4,6,10,12,16,18,22,24-octahydroxycalix[4]-resorcarene (3f)

Reddish orange solid, mp: 286-288 °C; FT-IR (KBr) *v*: 3351, 3058, 2919 cm^{-1}; ^{1}H NMR (300 MHz, DMSO-d_6) δ ppm: 5.50 (s, 1H, CH, H_3), 6.14 (s, 1H, Ar-H, H_4), 6.31 (s, 1H, Ar-H, H_5), 6.57-6.80 (m, 4H, Ar-H, H_1, H_2), 7.52-8.46 (OH, broad peak, H_6, 2H), ppm. ^{13}C NMR (75 MHz, DMSO-d_6) δ ppm: 65.20, 103.09, 124.29, 128.86, 130.43, 134.76, 138.08, 158.95.


%T
cm-1
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3351.55cm-1
1603.26cm-1
1507.06cm-1
1452.33cm-1
1301.00cm-1
1150.40cm-1
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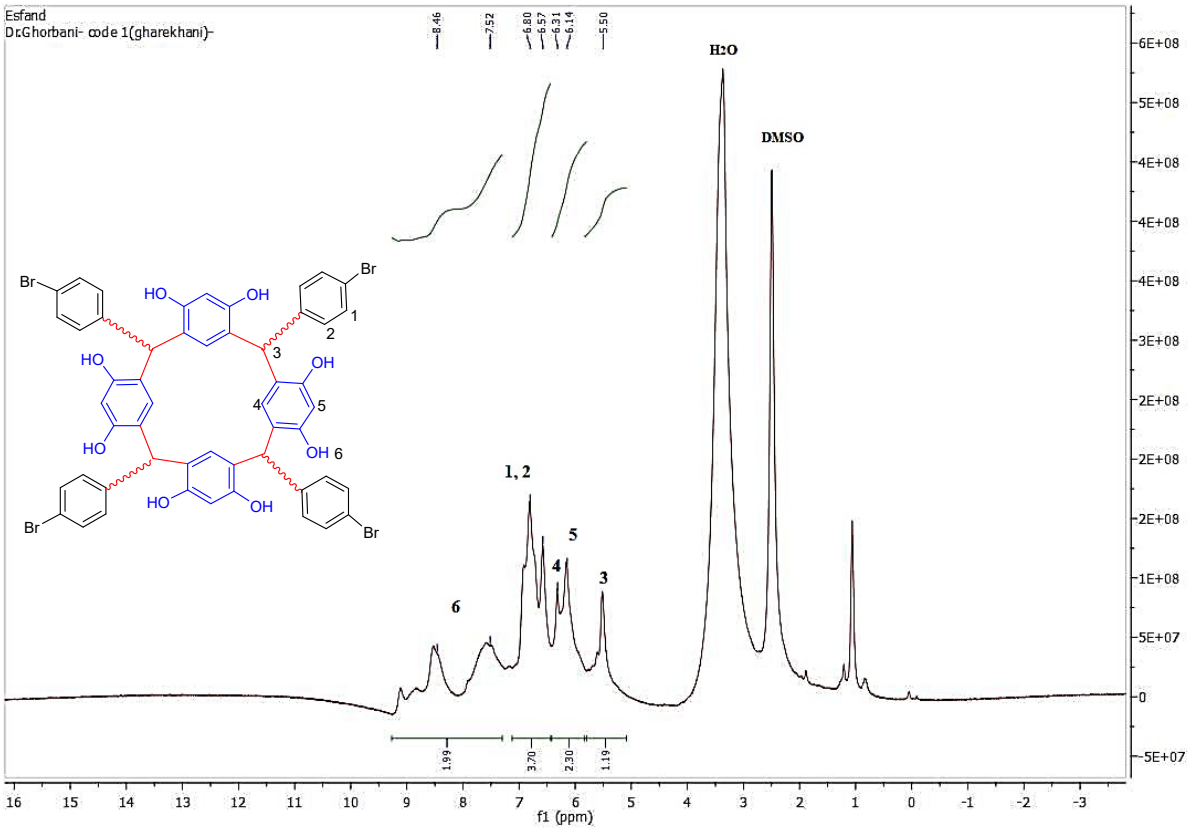
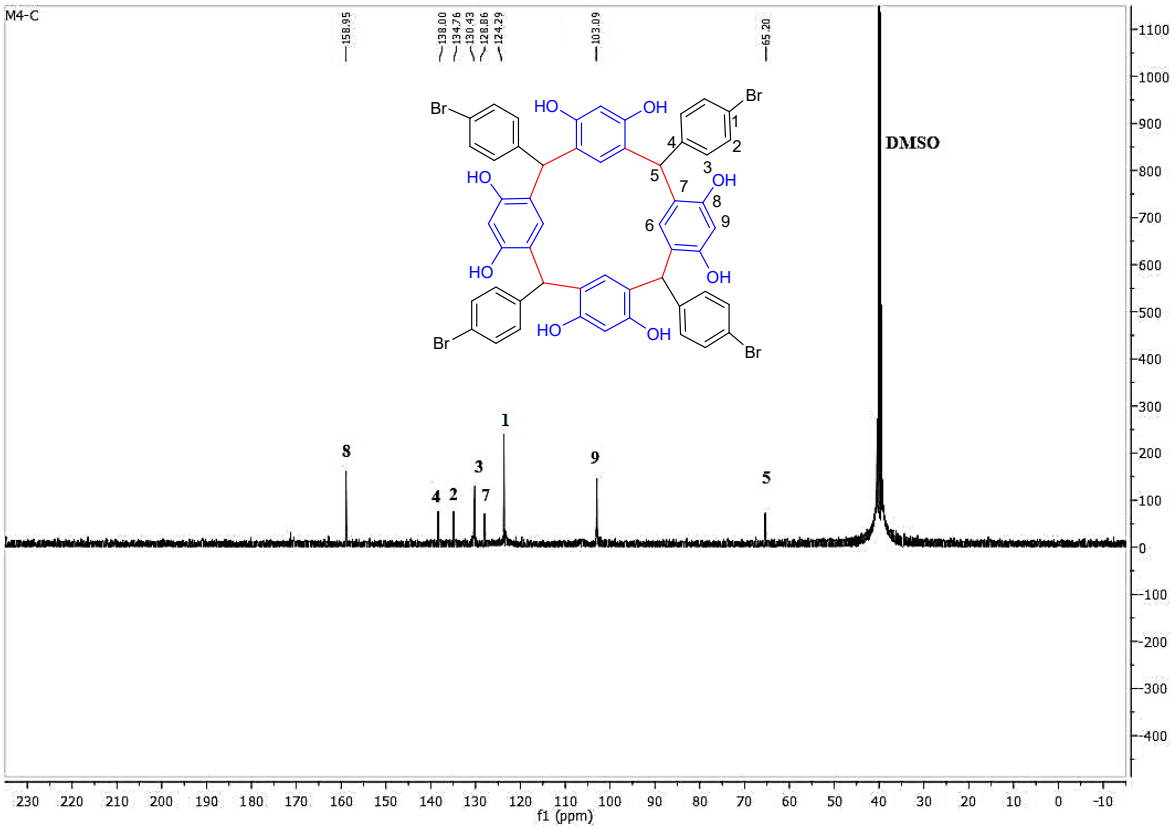
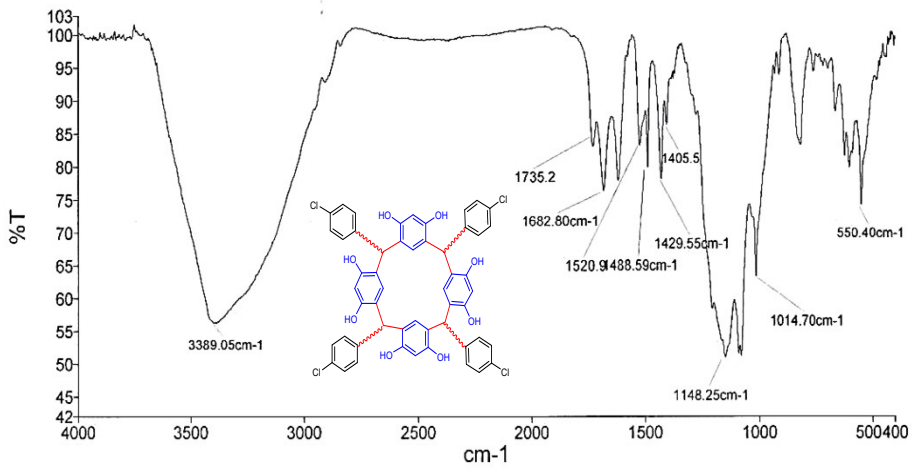
972.43cm-1
840.28cm-1
700.31cm-1
543.72cm-1
471.20cm-1

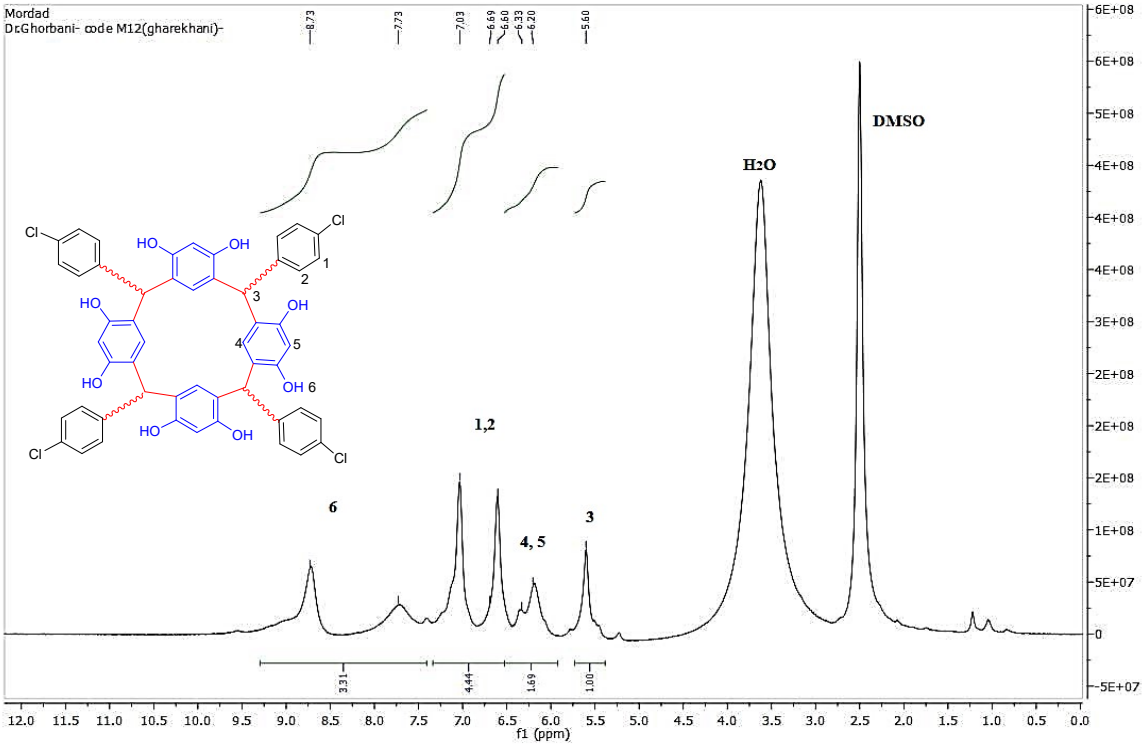

Esfand
DrGhorbani- code 1(gharekhani)-
H2O
DMSO
1, 2
3
4
5
6
f1 (ppm)

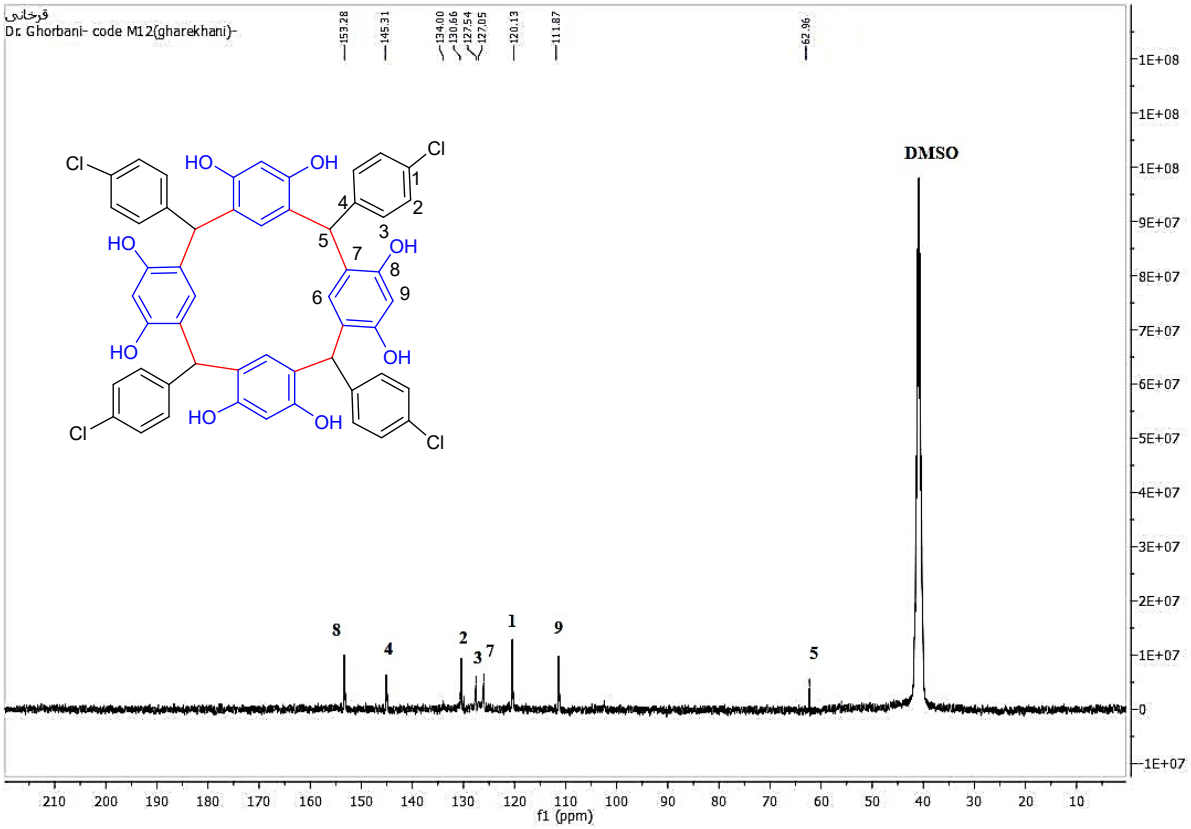


2,8,14,20-Tetra-p-chlorophenyl-4,6,10,12,16,18,22,24-octahydroxycalix[4]-resorcarene (3g)

Reddish orange solid, mp: 286-288 °C; FT-IR (KBr) *v*: 3389, 1520, 1148 cm^{-1}; ^{1}H NMR (300 MHz, DMSO-d_6) δ ppm: 5.60 (s, 1H, CH, H_3), 6.20 (s, 1H, Ar-H, H_4), 6.33 (s, 1H, Ar-H, H_5), 6.60 (broad peak, 2H, Ar-H, H_1), 6.69 (broad peak, 2H, Ar-H, H_2),7.73-8.83 (OH, broad peak, H_6, 3H), ppm. ^{13}C NMR (75 MHz, DMSO-d_6) δ ppm: 62.96, 111.87, 120.13, 127.05, 127.54, 130.66, 134.00, 145.31, 153.28.

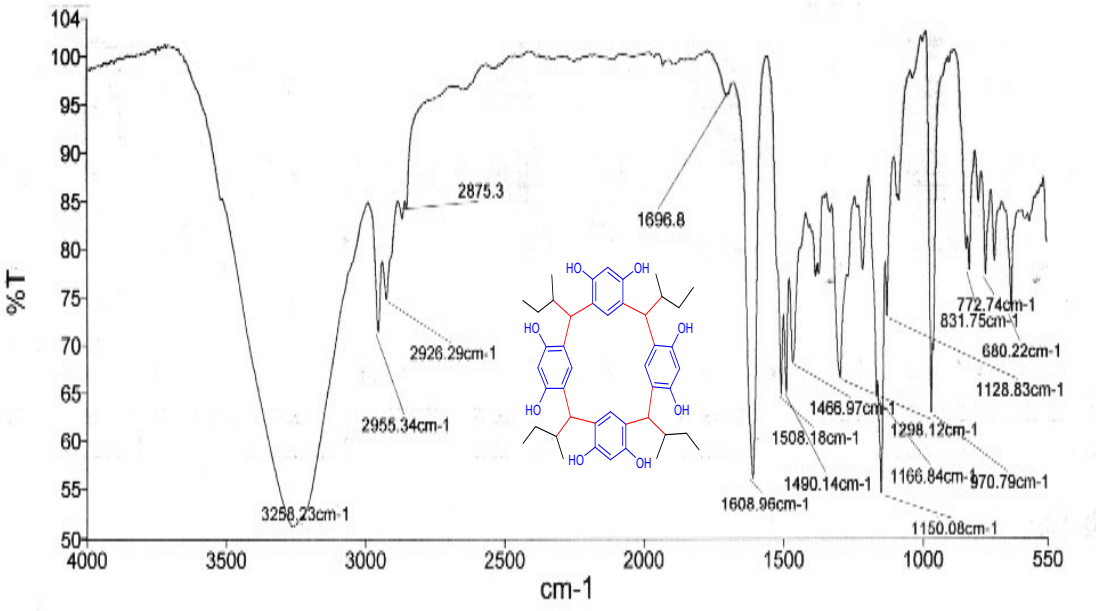


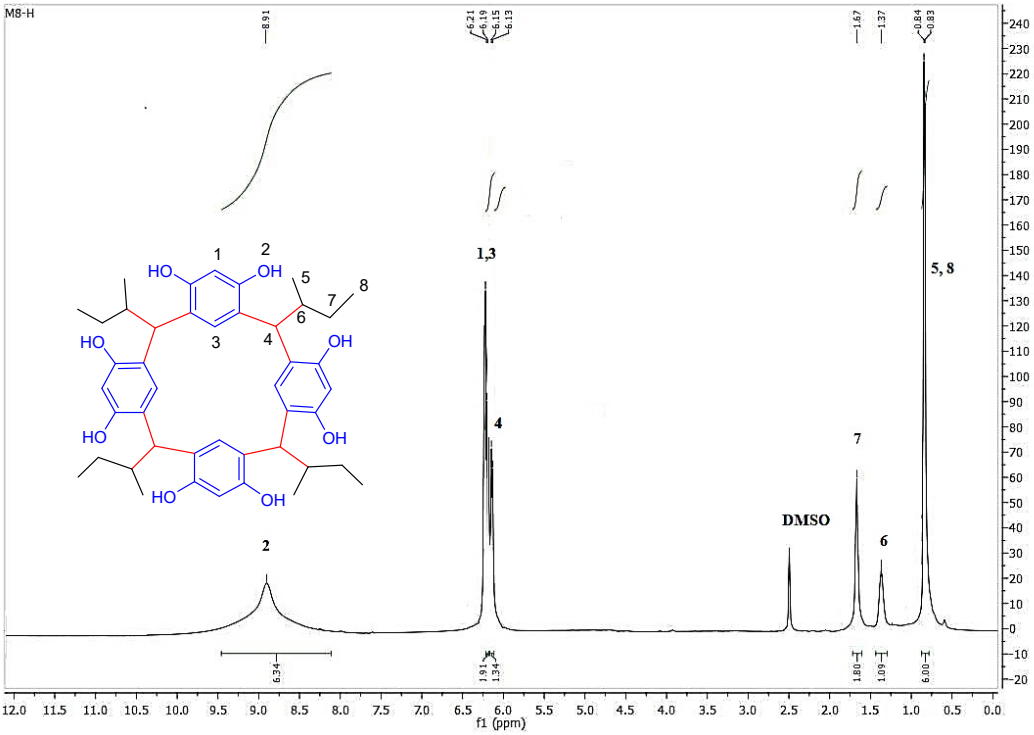

Mordad
Dr.Ghorbani- code M12(gharekhani)-
8.73
7.73
7.03
6.69
6.60
6.33
6.20
5.60
DMSO
H2O
1,2
6
4, 5
3
3.31
4.44
1.69
1.00
f1 (ppm)

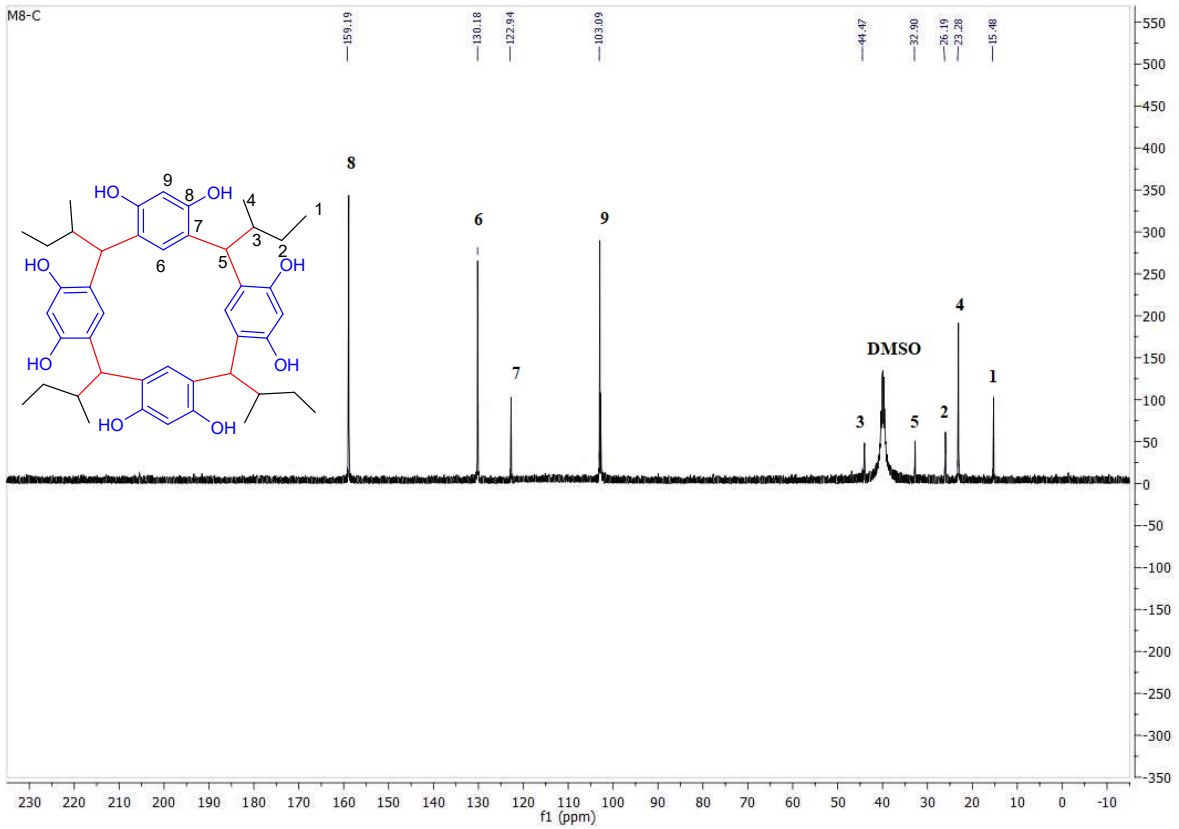

قرخانی
Dr. Ghorbani- code M12(gharekhani)-
153.28
145.31
134.00
130.66
127.54
127.05
120.13
111.87
62.96
DMSO
8
4
2
3
7
1
9
5
f1 (ppm)

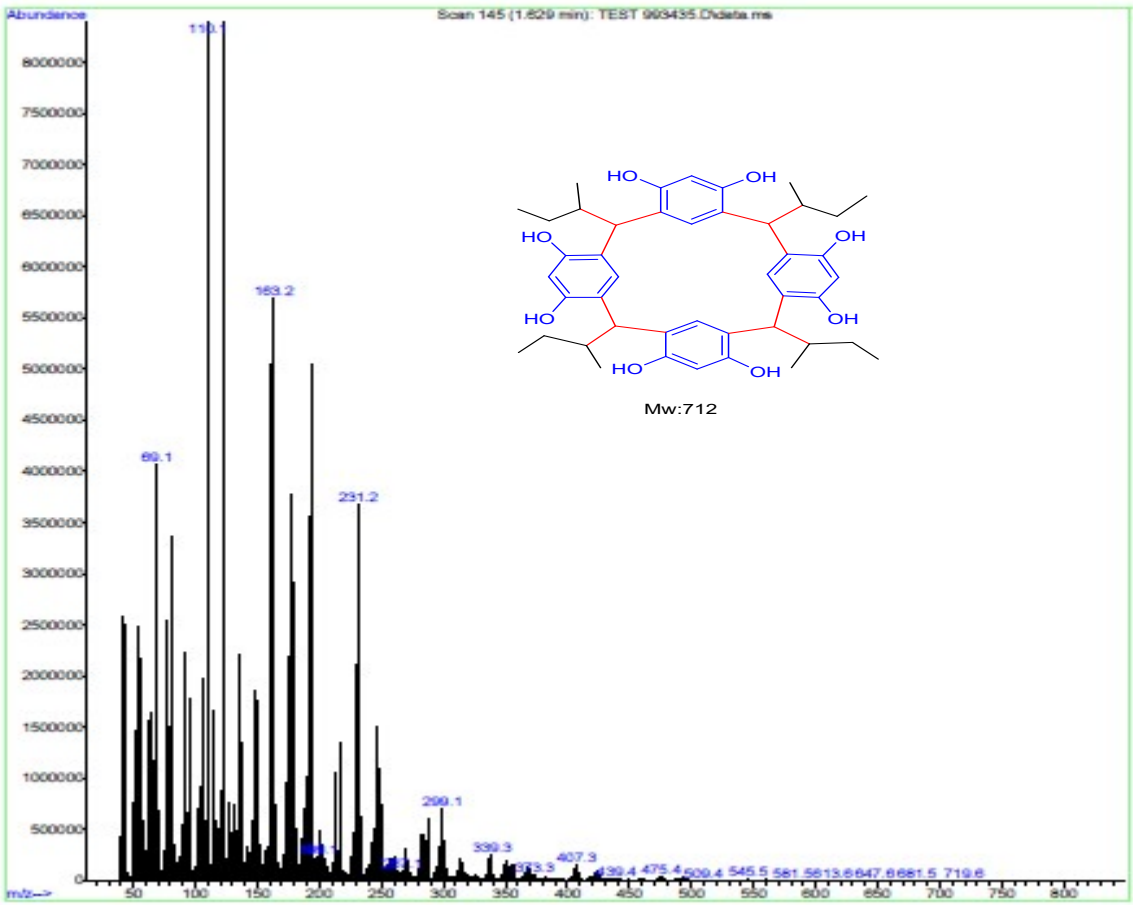
2,8,14,20-Isobutyl-4,6,10,12,16,18,22,24-octahydroxycalix[4]-resorcarene (3h)

Orange solid, mp: 286-288 °C; FT-IR (KBr) v: 3258, 2955, 2906 cm^{-1}; ^{1}H NMR (500 MHz, DMSO-d_6) δ ppm: 0.83 (s, 3H, CH_3, H_5), 0.84 (s, 3H, CH_3, H_8), 1.37 (m, 1H, H_6), 1.67 (m, 2H, H_7), 6.14 (s, 1H, Ar-H, H_4, 10 Hz), 6.19-6.21 (m, 2H, Ar-H, H_1,H_3), 8.91 (OH, broad peak, H_1, 3H), ppm. ^{13}C NMR (125 MHz, DMSO-d_6) δ ppm: 15.48, 23.28, 26.19, 32.90, 44.47, 103.09, 122.94, 130.18, 159.19. MS: m/z = 712 [M+].






M8-C
159.19
130.18
122.94
103.09
44.47
32.90
26.19
23.28
15.48
DMSO
f1 (ppm)


Abundance
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110.1
183.2
69.1
231.2
299.1
339.3
m/z-->

Mw:712